

What is claimed is:

1. A method for monitoring an ion implanter, comprising:  
  
positioning a substrate behind an interceptor for intercepting a portion of an ion beam to be irradiated toward the substrate;  
  
irradiating a first ion beam toward the substrate to form a first shadow on the substrate;  
  
rotating the substrate about a central axis of the substrate;  
  
irradiating a second ion beam toward the substrate to form a second shadow on the substrate; and  
  
measuring a dosage of ions implanted into the substrate to monitor whether the rotation of the substrate has been normally performed.
  
2. The method for monitoring an ion implanter as claimed in claim 1, wherein the ion beam is irradiated toward the substrate in a horizontal direction, and the substrate is tilted at a predetermined angle with respect to an advancing direction of the ion beam.

3. The method for monitoring an ion implanter as claimed in claim 2, wherein the semiconductor substrate is tilted at an angle of approximately  $7^{\circ}$  with respect to a vertical plane, and an incidence angel of the ion beam is approximately  $83^{\circ}$  with respect to the semiconductor substrate.

4. The method for monitoring an ion implanter as claimed in claim 1, wherein the dosage of ions implanted into the substrate is measured using a method selected from the group consisting of: measuring a thermal wave value of a surface of the semiconductor substrate, an image analysis method using a scanning electron microscope, an ingredient analysis method using a particle analyzing system, and an energy analysis method measuring a surface resistance of the semiconductor substrate.

5. The method for monitoring an ion implanter as claimed in claim 1, wherein the dosage of ions implanted into the substrate is measured using a method of measuring a thermal wave value of a surface of the semiconductor substrate.

6. The method for monitoring an ion implanter as claimed in claim 1, wherein the ion beam scans the substrate in a horizontal direction, and the substrate moves in a vertical direction according to a scanning of the ion beam during a formation of the first and second shadows.

7. The method for monitoring an ion implanter as claimed in claim 1, wherein the ion beam has a cross-section shape of a ribbon, the ion beam is irradiated in a horizontal direction, and the substrate moves in a vertical direction so that the ion beam entirely scans the substrate.

8. The method for monitoring an ion implanter as claimed in claim 1, wherein the ion beam has a cross-section shape of a ribbon and scans the semiconductor substrate in a vertical direction.

9. The method for monitoring an ion implanter as claimed in claim 1, wherein rotating the substrate about a central axis of the substrate

comprises rotating the semiconductor substrate about a central axis by an angle of approximately 180°.

10. The method for monitoring an ion implanter as claimed in claim 1, wherein the first and second shadows are formed at a peripheral portion of the substrate.

11. A method for monitoring an ion implanter, comprising:

interposing an interceptor for intercepting a portion of an ion beam to be irradiated toward a substrate between the substrate and an ion source for irradiating the ion beam;

irradiating a first ion beam toward the substrate to form a first shadow on the substrate;

rotating the substrate about a central axis of the substrate;

irradiating a second ion beam toward the substrate to form a second shadow on the substrate; and

measuring a dosage of ions implanted into the substrate to monitor whether the rotation of the substrate has been normally performed.

12. The method for monitoring an ion implanter as claimed in claim 11, wherein the substrate is tilted at a predetermined angle with respect to an advancing direction of the ion beam.

13. The method for monitoring an ion implanter as claimed in claim 11, wherein the semiconductor substrate is tilted at an angle of approximately  $7^{\circ}$  with respect to a vertical plane, and an incidence angle of the ion beam is approximately  $83^{\circ}$  with respect to the semiconductor substrate.

14. The method for monitoring an ion implanter as claimed in claim 11, wherein the dosage of ions implanted into the substrate is measured using a method selected from the group consisting of: measuring a thermal wave value of a surface of the semiconductor substrate, an image analysis method using a scanning electron microscope, an ingredient analysis method using a particle analyzing system, and an energy analysis method measuring a surface resistance of the semiconductor substrate.

15. The method for monitoring an ion implanter as claimed in claim 11, wherein the dosage of ions implanted into the substrate is measured using a method of measuring a thermal wave value of a surface of the semiconductor substrate.

16. The method for monitoring an ion implanter as claimed in claim 11, wherein the first and second shadows are formed at a peripheral portion of the substrate.

17. The method for monitoring an ion implanter as claimed in claim 11, wherein rotating the substrate about a central axis of the substrate comprises rotating the semiconductor substrate about a central axis by an angle of approximately 180°.

18. A method for monitoring an ion implanter, comprising:  
interposing an interceptor for intercepting a portion of an ion beam to be irradiated toward a substrate between the substrate and an ion source for

irradiating the ion beam, the substrate being tilted at a predetermined angle with respect to an advancing direction of the ion beam;

irradiating a first ion beam toward the substrate to form a first shadow on the substrate;

rotating the substrate about a central axis of the substrate with maintenance of the tilted angle;

irradiating a second ion beam toward the substrate to form a second shadow on the substrate;

measuring a thermal wave value of a surface of the substrate; and

comparing a first thermal wave value corresponding to the first shadow with a reference thermal wave value to monitor whether the rotation of the substrate has been normally performed.

19. The method for monitoring an ion implanter as claimed in claim 18, wherein the reference thermal wave value is a thermal wave value obtained through a normal ion implantation process.

20. The method for monitoring an ion implanter as claimed in claim 18, wherein the reference thermal wave value is a thermal wave value obtained through an abnormal ion implantation process.

21. The method for monitoring an ion implanter as claimed in claim 18, wherein the first and second shadows are formed at an edge exposure of wafer (EEW) portion of the substrate.

22. The method for monitoring an ion implanter as claimed in claim 18, wherein a size of the first and second shadows is variable according to a size of the shadow jig.

23. The method for monitoring an ion implanter as claimed in claim 11, wherein monitoring the rotation of the semiconductor substrate is performed by either a scanning electron microscope or a particle analyzing system.



24. An ion implanter, comprising:

an ion source for irradiating an ion beam toward a substrate;

an ion implantation chamber connected to the ion source for performing an ion implantation process on the substrate;

a chuck disposed in the ion implantation chamber for supporting the substrate, which is tilted at a predetermined angle with respect to an advancing direction of the ion beam;

a first driving unit for rotating the substrate about a central axis of the substrate in order to change an incidence angle of ion beam; and

a shadow jig for intercepting a portion of the ion beam in order to form a shadow on the substrate during the ion implantation process, wherein the shadow is formed to monitor whether the substrate has been normally rotated during the ion implantation process.

25. The ion implanter as claimed in claim 24, wherein the ion source comprises:

an ion generator for generating ions from a source gas;

an ion extractor for extracting the ions from the ion generator and for forming the ion beam;

a charge exchanger for converting a polarity of the ion beam formed by the ion extractor from positive to negative;

a mass analyzer for selecting specific ions from the negative ion beam;

an accelerator for accelerating the negative ion beam composed of the specific ions and for converting the negative ion beam into a positive ion beam; and

an ion deflector for adjusting an advancing direction of the ion beam.

26. The ion implanter as claimed in claim 24, wherein the ion generator is a type of ion generator selected from the group consisting of: an arc discharge type, a radio frequency type, a duoplasmatron type, a cold cathode type, a sputter type, and a penning ionization type.

27. The ion implanter as claimed in claim 24, wherein the semiconductor substrate is tilted at an angle of approximately  $7^{\circ}$  with respect

to a vertical plane, and an incidence angel of the ion beam is approximately 83° with respect to the semiconductor substrate.

28. The ion implanter as claimed in claim 24, wherein the first driving unit comprises a step motor.

29. The ion implanter as claimed in claim 24, further comprising a second driving unit for adjusting the angle at which the substrate is tilted.

30. The ion implanter as claimed in claim 24, further comprising a second driving unit for moving the chuck in a vertical direction.

31. The ion implanter as claimed in claim 24, wherein the chuck includes a platen for holding the substrate using an electrostatic force, and a supporting member for supporting the platen.

32. The ion implanter as claimed in claim 31, wherein the platen has a disc shape.

33. The ion implanter as claimed in claim 24, wherein the shadow jig includes a shadow bar for forming the shadow at a peripheral portion of the substrate, and a bracket for supporting the shadow bar.

34. The ion implanter as claimed in claim 33, wherein the shadow bar only extends over an edge exposure of wafer (EEW) portion of the semiconductor substrate.

35. The ion implanter as claimed in claim 33, further comprising a second driving unit connected to the bracket for moving the shadow jig, wherein the second driving unit moves the shadow jig away from a central portion of the chuck while the substrate is loaded on or unloaded from the chuck, and the second driving unit moves the shadow jig toward a central portion of the chuck for forming the shadow on the substrate during the ion implantation process.

36. The ion implanter as claimed in claim 35, wherein the second driving unit comprises:

a rack movably connected to a supporting member for supporting a platen that holds the substrate;

a motor for supplying a driving force; and

a pinion for connecting the rack and the motor.

37. The ion implanter as claimed in claim 36, wherein the supporting member comprises a guide groove for guiding the rack in an upper portion thereof.

38. The ion implanter as claimed in claim 24, wherein the shadow jig comprises a heat-resistant material.

39. The ion implanter as claimed in claim 38, wherein the heat-resistant material is fluoric resin.

40. The ion implanter as claimed in claim 33, further comprising a second driving unit connected to the bracket for moving the shadow jig, wherein the second driving unit rotates the shadow jig in the vertical direction while the substrate is loaded on or unloaded from the chuck, and the second driving unit rotates the shadow jig back in the horizontal direction for forming the shadow on the substrate during the ion implantation process.